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Three new species of *Lachnum* (*Hyaloscyphaceae*, *Helotiales*) from Korea

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Abstract – Some interesting hyaloscyphaceous discomycetes were encountered during our mycofloristic investigation of Korea. Among them three foliicolous species of *Lachnum* are described as new taxa. *Lachnum rachidicola* was found on decaying rachis of compound leaves of *Juglans mandshurica. Lachnum hongcheonense* and *L. linderae* were collected on rotting leaves of *Quercus* and *Lindera*, respectively.

Key words – *Ascomycetes*, leaf-inhabiting fungi, taxonomy

Introduction

In continuation of the previous study (Raitviir & Shin 2003) the authors conducted a careful examination of some discomycetous fungi collected from Korea, of which three foliicolous *Lachnum* species turned out to represent new taxa. Their descriptions and illustrations are given.

Materials and methods

The dry materials were rehydrated in 3% aqueous KOH. Melzer's reagent (MLZ) and Lugol's solution (IKI) were used for histochemical reactions. An Olympus BX50 microscope equipped with a drawing tube was used. Measurements of ascospore are shown by the averages ± standard deviations as well as maxima and minima in parentheses. Line drawings and measurements were made in KOH and cotton-blue (CB) unless otherwise stated. The stereomicroscopic photographs were taken by an Olympus SZ40 with digital camera (PixeLINK

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PL-A642). All specimens studied are housed in the Korea University herbarium, KUS, and isotypes of new taxa are deposited in the herbarium of the Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, TAA.

List of new species

Lachnum rachidicola J.G. Han, Raitv. & H.D. Shin, **sp. nov.** Fig. 1

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Apothecia gregaria, longe stipitata, primo subglobosa, dein cupulata usque ad applanato-cupulata, 0.5–2 mm diametro, disco albido vel pallide cremeo, sicca pallide brunneo, receptaculo niveo, vulnerato erubescente, sicca cremeo vel pallide brunneo, dense longipiloso. Excipulum ectale ex textura prismatica compositur, cellulis hyalinis, tenuiter tunicatis, 8–20 × 5–9 µm. Pili cylindracei, apicibus subclavatis, 2–3(–4)-septati, tenuiter hyalinotunicati, verruculati, 25–46 × 2–3 µm. Asci non uncinati, cylindraceo-clavati, octospori, 29–41 × 3.5–4.5 µm, poro MLZ+. Sporae uniseriatae vel irregulariter biseriatae, hyalinae, cylindraceo-clavatae, interdum anguste clavato-ellipsoideae vel clavato-fusoideae, rectae vel minute curvatae, aseptatae, non guttulatae, rariter minute biguttulatae, (5–)5.2–6.4(–7) × (1–)1.2–1.5(–1.6) µm. Paraphyses anguste lanceolatae vel lanceolatae, ascos 5–15 µm superantes, basi 1–2-septate, 2.5–4 µm in diametro.

Species foliicola ascis non uncinatis e apotheciis erubescentis distincta.

Type – On rachis of compound leaves of *Juglans mandshurica* Maxim., Korea National Arboretum, Pocheon, Korea, 37°41'42"N 127°9'47"E, alt. 40 m, 8.V.2002, H.D. Shin (**holotype** *KUS-F50489*, isotype *TAA-182258*).

Apothecia gregarious, seated on a long, well-developed, cylindrical stipe. Receptacle at first almost globose, then becoming cupulate to shallow-cupulate, pure white when fresh, slightly reddening if wounded, cream-colored to pale yellowish or pale brownish when dry, externally densely covered with white hairs. Disc 0.5–2 mm in diameter, white to pale cream-colored when fresh, brownish to pale brown when dry. Stipe up to 3 mm long, concolorous to the receptacle. Hairs cylindric with slightly clavate apex, hyaline, 2–3(–4)-septate, thin-walled, finely warty, not bearing crystals, 25–46 × 2–3 µm, apically swollen up to 4 µm wide. Ectal excipulum hyaline, composed of textura porrecta in the stipe and textura prismatica in the flanks of the cup, cells thin-walled of variable size, 8–20 × 5–9 µm. In old darkened apothecia some brownish amorphous matter is present in intercellular spaces. Asci arising from simple septa, cylindric-clavate, 8-spored, 29–41 × 3.5–4.5 µm, apical pore blue in MLZ. Ascospores uniseriate or irregularly biseriate, clavate-cylindric, sometimes narrowly clavate-ellipsoid to clavate-fusoid, straight to slightly curved, hyaline, aseptate, without inclusions, rarely with bipolar guttules, (5–)5.2–6.4(–7) × (1–)1.2–1.5(–1.6) µm, avg. 5.8 × 1.4 µm (n = 40). Paraphyses narrowly lanceolate to lanceolate, 1(–2)-septate at the base, exceeding the asci by 5–15 µm, 2.5–4 µm wide at the broadest parts.

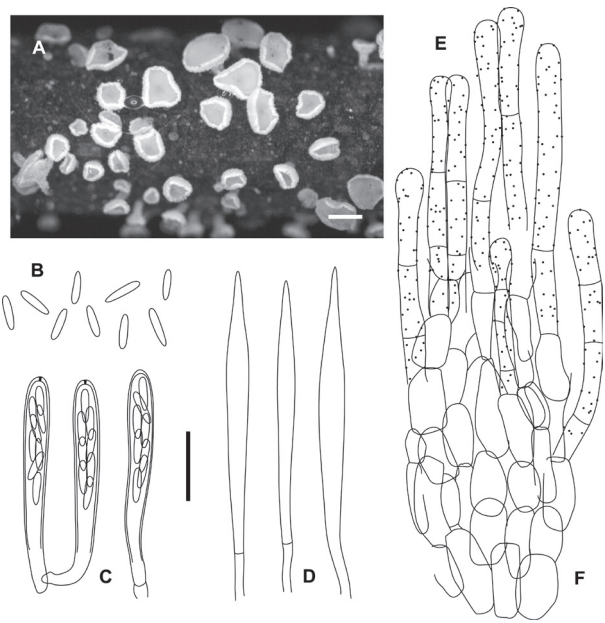

Figure 1. *Lachnum rachidicola* (holotype KUS-F50489).
A: apothecia; B: ascospores; C: asci; D: paraphyses; E: hairs; F: ectal excipulum.
White bar for A = 1 mm, black bar for B–F = 10 µm.

Additional specimens examined – KOREA: Hoengseong, Hoengseong recreation forest, 37°32'13"N 128°7'9"E, alt. 300 m, 22.VI.2006, J.G. Han & H.D. Shin (*KUS-F51117*); Hongcheon, Sambong recreation forest, 37°51'58"N 128°27'57"E, alt. 730 m, 26.VI.2008, J.G. Han & H.D. Shin (*KUS-F52142*); Pyeongchang, Mt. Doota recreation forest, 37°34'33"N 128°34'43"E, alt. 970 m, 17.VII.2008, J.G. Han & H.D. Shin (*KUS-F52196*).

Notes – It seems to be a vernal to early summer species growing on decaying rachis of pinnately compound leaves of *Juglans mandshurica*. It differs from all other species growing on fallen leaves and forest debris in absence of croziers and reddening apothecia.

Lachnum hongcheonense J.G. Han, Raitv. & H.D. Shin, **sp. nov.** Fig. 2
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Apothecia gregaria usque ad dispersa, longe stipitata, primo subglobosa, dein applanato-cupulata, 0.5–1 mm diametro, disco pallide luteo vel cremeo, receptaculo niveo, dense longipiloso. Excipulum ectale ex textura prismatica compositur, cellulis hyalinis, tenuiter tunicatis, 10–16 × 6–12 µm. Pili cylindracei usque ad cylindraceo-clavati, 2–4(–5)-septati, tenuiter hyalinotunicati, verruculati, usque ad 80 × 2.5–3 µm, apicibus capitatis usque ad 6 µm latis. Asci non uncinati, cylindraceo-clavati, octospori, 36–48 × 3–4 µm, poro MLZ+. Sporae biseriatae, hyalinae, anguste cylindraceo-fusoideae, interdum anguste clavato-

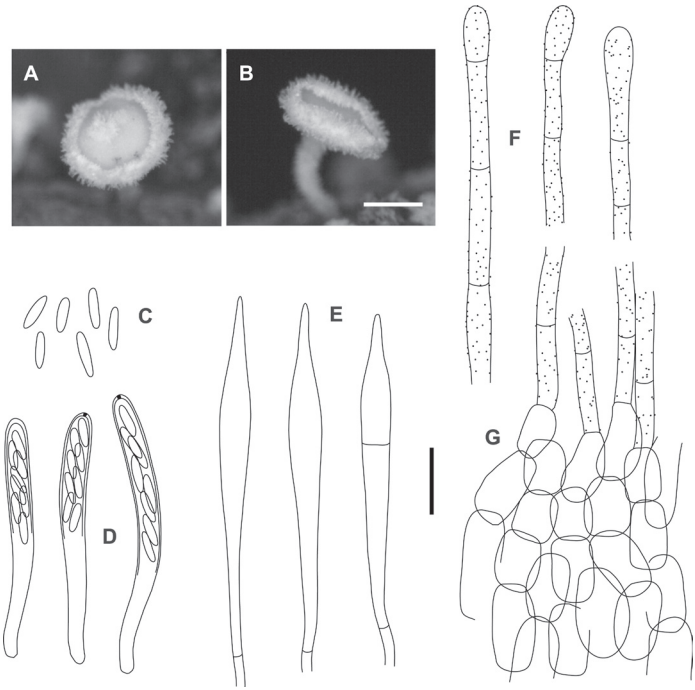

Figure 2. *Lachnum hongcheonense* (holotype KUS-F50509).
A, B: apothecia; C: ascospores; D: asci; E: paraphyses; F: hairs; G: ectal excipulum.
White bar for A and B = 0.5 mm, black bar for C–G = 10 µm.

fusoideae, rectae vel minute curvatae, aseptatae, non guttulatae, (5.5–)5.8–7.0(–7.7) × (1.2–)1.3–1.6(–1.7) µm. Paraphyses lanceolatae, ascos 20–35 µm superantes, 4–6 µm in diametro.

In foliis putridis quercinis crescit. A Lachno charretii e Lachno alnifolio ascis non uncinatis et pilis capitatis differt.

Type – On damp rotting leaves of *Quercus* sp., Experimental Forest of Kangwon National University, Hongcheon, Korea, 37°44'23"N 127°49'54"E, alt. 220 m, 10.V.2002, J.G. Han & H.D. Shin (**holotype** *KUS-F50509*, isotype *TAA-182261*).

Apothecia superficial, gregarious to scattered, seated on a well-developed, cylindrical stipe. Receptacle at first almost globose, then becoming shallow-cupulate, pure white when fresh and dry, externally densely covered with whitish hairs. Disc 0.5–1 mm in diameter, flat to slightly concave, pale yellowish or cream-colored when fresh and dry. Stipe up to 1.5 mm long, concolorous with the receptacle. Hairs cylindric to cylindric-clavate, hyaline, 2–4(–5)-septate, thin-walled, finely warty, not bearing crystals, up to 80 µm long, 2.5–3 µm wide, apically capitate, swollen up to 6 µm wide. Ectal excipulum composed of textura prismatica, cells hyaline, thin-walled, comparatively big

and wide, 10–16 × 6–12 µm at the flanks of the cup, becoming smaller and narrower toward the margin. Asci arising from simple septa, cylindric-clavate, 8-spored, 36–48 × 3–4 µm, apical pore blue in MLZ. Ascospores biseriate, occupying the upper half of the ascus, narrowly cylindric-fusoid, sometimes narrowly clavate-fusoid, straight to slightly curved, hyaline, aseptate, without inclusions, (5.5–)5.8–7.0(–7.7) × (1.2–)1.3–1.6(–1.7) µm, avg. 6.4 × 1.5 µm (n = 40). Paraphyses lanceolate, containing small refractive globules, exceeding the asci by 20–35 µm, 4–6 µm wide at the broadest parts.

Notes – This species of *Lachnum* on fallen leaves is similar to *Lachnum charretii* Raitv. & Guy Garcia and *L. alnifolium* (Raitv.) Raitv. It differs from both of them in the absence of crozier at the ascus base and capitate hairs, and from the first one also in yellowish disc (Raitviir 1986, Raitviir & Garcia 2000). Its paraphyses are relatively thicker than those of other members of *Lachnum*.

Lachnum linderae J.G. Han, Raitv. & H.D. Shin, **sp. nov.** Fig. 3

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Apothecia dispersa, breviter stipitata, primo subglobosa, dein applanato-cupulata, 1 mm diametro, disco pallide luteo vel cremeo, sicca pallide brunneo, receptaculo albido, dense longipiloso. Excipulum ectale ex textura prismatica compositur, cellulis hyalinis, tenuiter tunicatis, 10–16 × 5–10 µm. Pili cylindracei, 2–3-septati, tenuiter hyalinotunicati, verruculati, usque ad 83 × 3 µm. Asci uncinati, cylindraceo-clavati, octospori, 30–46 × 3–4.5 µm, poro MLZ+. Sporae biseriatae, hyalinae, anguste cylindraceo-fusoideae, interdum anguste clavato-fusoideae, rectae vel minute curvatae, 0–1-septate, non guttulatae, (6–)6.5–8.1(–9) × (1.4–)1.5–1.9(–2) µm. Paraphyses lanceolatae, ascos 20–40 µm superantes, 4–8 µm in diametro.

In foliis putridis Linderae obtusilobae et Linderae erythrocarpae crescit. Lachno albidulo similis, sed in sporis brevioribus differt.

Type – On leaves of *Lindera obtusiloba* Blume, Bokwang-ri, Gangneung, Korea, 37°45'38"N 128°47'29"E, alt. 320 m, 1.VII.2002, H.D. Shin (**holotype** *KUS-F50570*, isotype *TAA-182263*).

Apothecia superficial, scattered, seated on a short, well-developed, cylindrical stipe. Receptacle at first almost globose, then becoming shallow-cupulate, white when fresh and dry, externally densely covered with whitish hairs. Disc up to 1 mm in diameter, flat to slightly concave, pale yellowish to cream-colored when fresh and dry. Stipe up to 1 mm long, concolorous to the receptacle. Hairs cylindric, hyaline, 2–3-septate, thin-walled, finely warty, not bearing crystals, up to 83 µm long, 3 µm wide. Ectal excipulum composed of textura prismatica, cells thin-walled, hyaline, 10–16 × 5–10 µm. Asci arising from croziers, cylindric-clavate, 8-spored, 30–46 × 3–4.5 µm, apical pore blue in MLZ. Ascospores biseriate, narrowly cylindric-fusoid, sometimes narrowly clavate-fusoid, straight to slightly curved, hyaline, 0–1-septate, without inclusions, (6–)6.5–8.1(–9) × (1.4–)1.5–1.9(–2) µm, avg. 7.3 × 1.7 µm (n = 40).

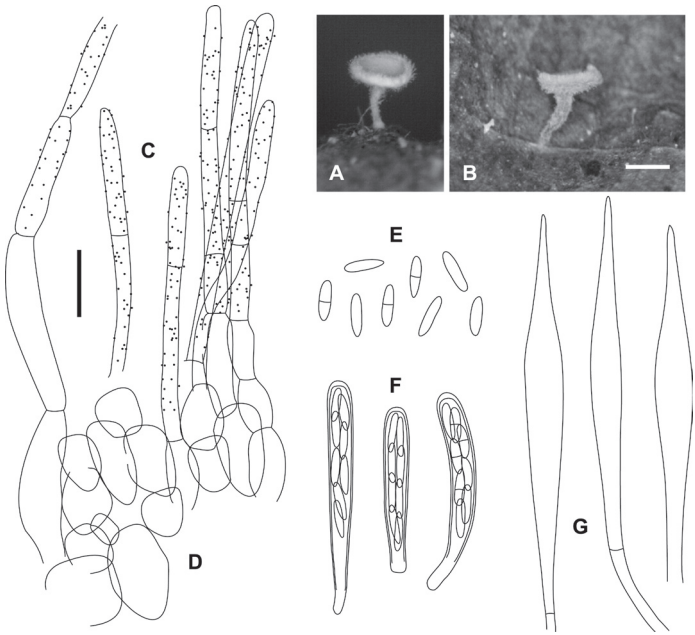

Figure 3. *Lachnum linderae* (holotype KUS-F50570).
A, B: apothecia; C: hairs; D: ectal excipulum; E: ascospores; F: asci; G: paraphyses.
White bar for A and B = 0.5 mm, black bar for C–G = 10 µm.

Paraphyses lanceolate, exceeding the asci by 20–40 µm, 4–8 µm wide at the broadest parts.

Additional specimens examined – On leaves of *Lindera obtusiloba*, KOREA: Muju, Anseong valley in Mt. Deokyu National Park, 35°50'14"N 127°42'15"E, alt. 640 m, 24.IV.2006, J.G. Han & H.D. Shin (*KUS-F50986*); Muju, Gucheondong valley in Mt. Deokyu National Park, 35°53'1"N 127°46'40"E, alt. 680 m, 25.IV.2006, J.G. Han & H.D. Shin (*KUS-F50993*); Dongducheon, Mt. Soyo, 37°56'37"E 127°5'8"E, alt. 320 m, 20.V.2006, J.G. Han & H.D. Shin (*KUS-F51050*); Hongcheon, Hwajeon-ri, 37°36'59"N 127°45'16"E, alt. 220 m, 16.VI.2006, J.G. Han & H.D. Shin (*KUS-F51085*); Gongju, Hashin-ri, 36°22'37"N 127°14'13'E, alt. 170 m, 24.IV.2007, J.G. Han & H.D. Shin (*KUS-F51529*); Wonju, Guryong temple in Mt. Chiak National Park, 37°23'51"N 128°3'2"E, alt. 380 m, 21.V.2007, J.G. Han & H.D. Shin (*KUS- F51569*); Yangpyeong, Experimental Forest of Korea University, 37°24'48"N 127°45'4"E, alt. 130 m, 27.IV.2008, J.G. Han & H.D. Shin (*KUS-F52032*); Hongcheon, Deokchi-ri, 37°41'37"N 127°57'27"E, alt. 210 m, 6.V.2008, J.G. Han & H.D. Shin (*KUS-F52054*); Cheolwon, Mt. Bokju recreation forest, N38°8'32"N 127°28'44"E, alt. 620 m, 16.V.2008, J.G. Han & H.D. Shin (*KUS-F52054*); Pocheon, Gukmangbong recreation forest, 38°1'1"N 127°23'49"E, alt. 430 m, 17.V.2008, J.G. Han & H.D. Shin (*KUS-F52073*); Dongducheon, Mt. Soyo, 37°56'29"N 127°4'9"E, alt. 280 m, 20.V.2008, J.G. Han & H.D. Shin (*KUS-F52077*); Hoengseong,

Heongseong recreation forest, 37°32'9"N 128°7'9"E, alt. 320 m, 20.VI.2008, J.G. Han & H.D. Shin (*KUS-F52120*); Yangyang, Micheongol recreation forest, 37°56'36"N 128°31'14"E, alt. 310 m, 26.VI.2008, J.G. Han & H.D. Shin (*KUS-F52147*). On leaves of *Lindera erythrocarpa* Makino, KOREA: Seogwipo, Seogwipo recreation forest, 33°18'52"N 126°28'24"E, alt. 710 m, 8.V.2006, J.G. Han & H.D. Shin (*KUS-F51020*); Hamyang, Mt. Jiri recreation forest, 35°20'58"N 127°38'38"E, alt. 600 m, 5.V.2008, J.G. Han & H.D. Shin (*KUS-F52047*); Sancheong, Georim valley in Mt. Jiri National Park, 35°17'31"N 127°42'50"E, alt. 890 m, 6.V.2008, J.G. Han & H.D. Shin (*KUS-F52049*); Daejeon, Mt. Manin recreation forest, 36°11'49"N 127°26'49"E, alt. 330 m, 24.V.2008, J.G. Han & H.D. Shin (*KUS-F52089*).

Notes – *Lachnum linderae* can be compared in its short asci with *L. rhytismatis* (W. Phillips) Nannf., but the latter has conspicuous crystal balls on its hairs and strongly clavate spores. *Lachnum alnifolium* is also close to the present species but has longer asci and much shorter paraphyses exceeding the asci by up to 18 µm (Raitviir 1986). There is a pantropical foliicolous species *L. albidulum* (Penz. & Sacc.) M.P. Sharma growing on wide variety of fallen leaves but it is distinguished by its longer spores measuring 10−15 × 1.2−1.7 µm (Haines 1992). This new fungus apparently shows substrate-specificity on leaves of *Lindera* spp.

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